Idaho Power

NIAGARA SPRINGS HATCHERY.
ANNUAL REPORT

Brood Year 1986

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ABSTRACT

Niagara Springs Hatchery is located in south-central Idaho in the Snake River Canyon, 10 miles south of Wendell. It is owned and financed by Idaho Power Company and operated by the Idaho Department of Fish and Game. The hatchery received a total of 2,274,371 eyed eggs from the Pahsimeroi and Oxbow fish hatcheries. The hatchery produced 1,851,895 steelhead, of which 800,000 were planted in the Snake River at Hells Canyon, 39,995 and 712,200 were planted in the Pahsimeroi River during the spring and fall, respectively, and 299,700 smolts were planted into Panther Creek. A record 419,000 pounds of fish were produced at a conversion of 1.33 pounds of feed required per pound of fish produced.

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INTRODUCTION

Niagara Springs Hatchery is one of the largest privately owned steelhead hatcheries in America. The hatchery is located 10 miles south of Wendell, Idaho, in the Snake River Canyon. Idaho Power Company owns and finances the hatchery which is operated by the Idaho Department of Fish and Game. Niagara Springs Hatchery is part of Idaho Power Company's mitigation program provided under the terms of the Federal Energy Regulatory Commission, License #1971, for the Hells Canyon hydroelectric complex.

The hatchery receives water from Niagara Spring at a constant temperature of 58°F temperature. The 30 ft. x 90 ft. hatchery building includes an office, two incubator rooms with 20 circular vats and 20 upwelling incubators, a feed storage room, a small shop, a garage, and three restrooms. The hatchery also has one small storage building and a building that houses a 20-ton refrigeration unit that chills water used in fish transport. There are 14 outside raceways, 300 ft. x 10 ft. x 3 ft., requiring 130 cfs of water during maximum production. The hatchery has three wood-frame homes and one mobile home for housing permanent employees. The hatchery receives its eggs from the Pahsimeroi and Oxbow hatcheries.

OBJECTIVES

The purpose of Niagara Springs Hatchery is to preserve a run of steelhead (Salmo gairdneri) in the Snake River below Hells Canyon Dam and to relocate a portion of that run to the Salmon River drainage.

The fish culture objectives of Niagara Springs Hatchery are:

1. To rear 200,000 pounds of steelhead smolts to be released in the Salmon River drainage.

2. To rear 200,000 pounds of steelhead smolts to be released into the Snake River below Hells Canyon Dam.

STAFFING

The hatchery is staffed with four permanent employees and two temporary employees. The permanent employees consist of a Superintendent III, a Superintendent I, and two fish culturists.

EGG SHIPMENTS AND EARLY REARING

Between April 6 and May 2, Pahsimeroi Hatchery sent Niagara Springs Hatchery a total of 1,339,176 eggs. Swim-up fry were ponded from May

16 through May 28; an 86.41 survival rate was attained with a total of 1,157,194 fish moved to the outside raceways.

Hells Canyon egg shipments were received from April 11 through April 30. During that time, 935,195 eggs were received. The survival of eggs and fry to ponding was 83.241. A total of 797,036 fry were moved to the outside raceways.

Upon arrival, eggs were disinfected in a 1:300 solution of iodine before being placed into the incubators. Pahsimeroi incubators held from 112,500 to 208,404 eggs. Hells Canyon incubators held from 84,642 to 142,251 eggs. Eggs were measured using the water displacement method.

Nursery feeding was done by sight until the fish began feeding well. Fry were fed eight times per day. Density indexes averaged 1.26 prior to the fry being moved outside. A mortality rate of 151 occurred while the fish were in the nursery (total yearly mortality was 18.6%).

FEEDING

Niagara Springs Hatchery used Rangens brand feed during the year. During early rearing, fish were fed Rangens Soft Moist Diet and later switched to Rangen's Trout/Salmon dry diet.

A total of 557,960 pounds of feed were fed, producing 419,000 pounds of fish, a conversion of 1.33 (Fig. 1). A total of 44,300 pounds of medicated feed was fed at a cost of $8,684.67.

Fish were fed by hand in nursery vats and raceways from starter mash to Number 4 size. After the fish were large enough to take 3/32 size feed, they were fed using the Nielsen feeders on the bridge.

Fish were fed by sight during early rearing until they were taking feed well. Once the fish were feeding well, feed levels were adjusted using the hatchery constant method (Piper et al. 1982). Fish were inventoried once per month.

WATER FLOWS

A Bristol Babcock Dynamaster, Series 4330-OOC, round chart recorder and a Dieterich Standard Corporation Flow meter were installed to measure the hatchery inflow. The flow meter was installed during September, but wasn't working correctly until mid-December.

Flows were increased each month to correspond with past years. Higher than normal flows were maintained from November through March corresponding to the increased pounds of fish being raised. Flows were maintained above 90 cfs for the period from November 25 to release time (Fig. 2).

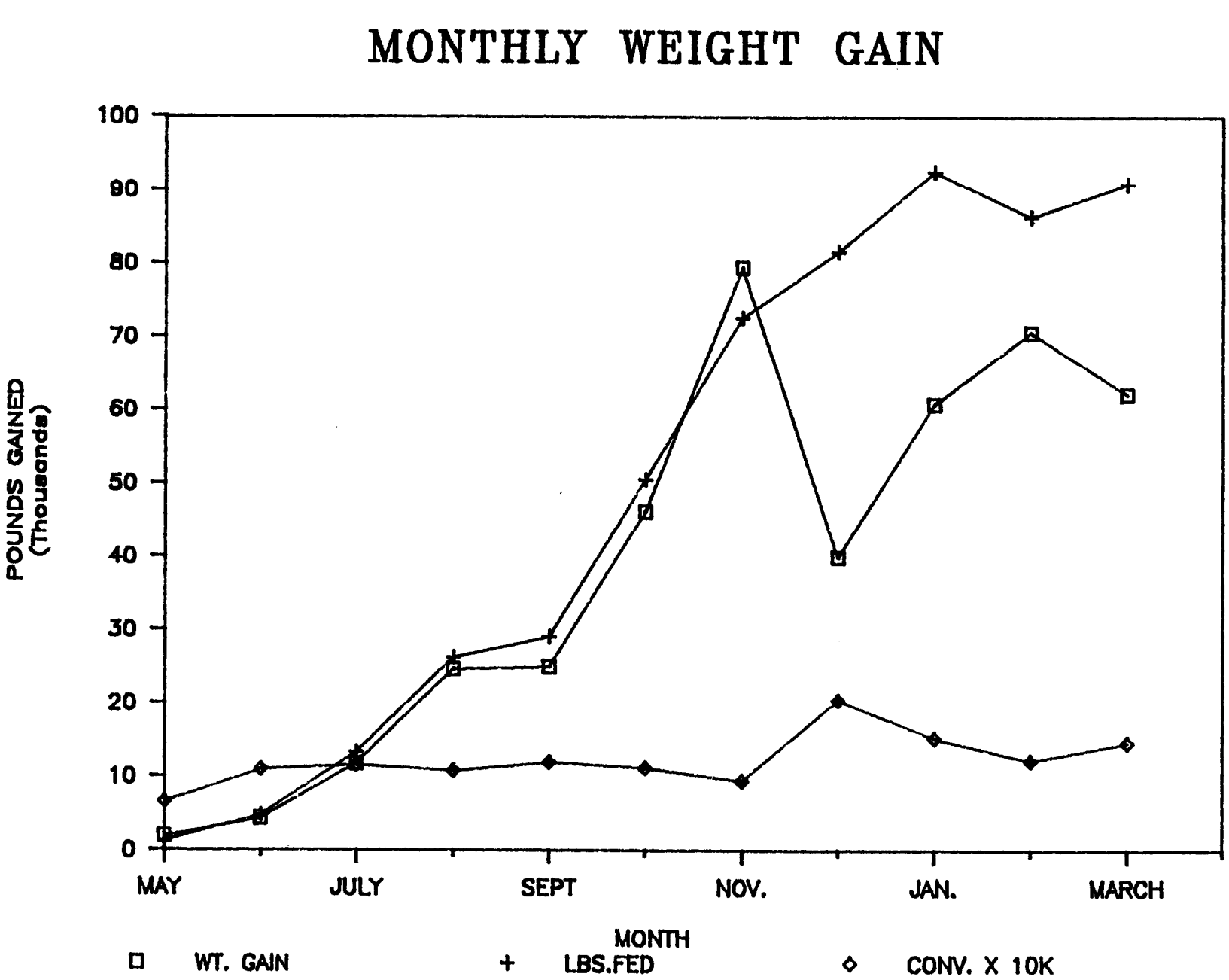

Figure 1. Monthly weight gain, pounds of feed used, and conversion at Niagara Springs Hatchery for brood year 1986.

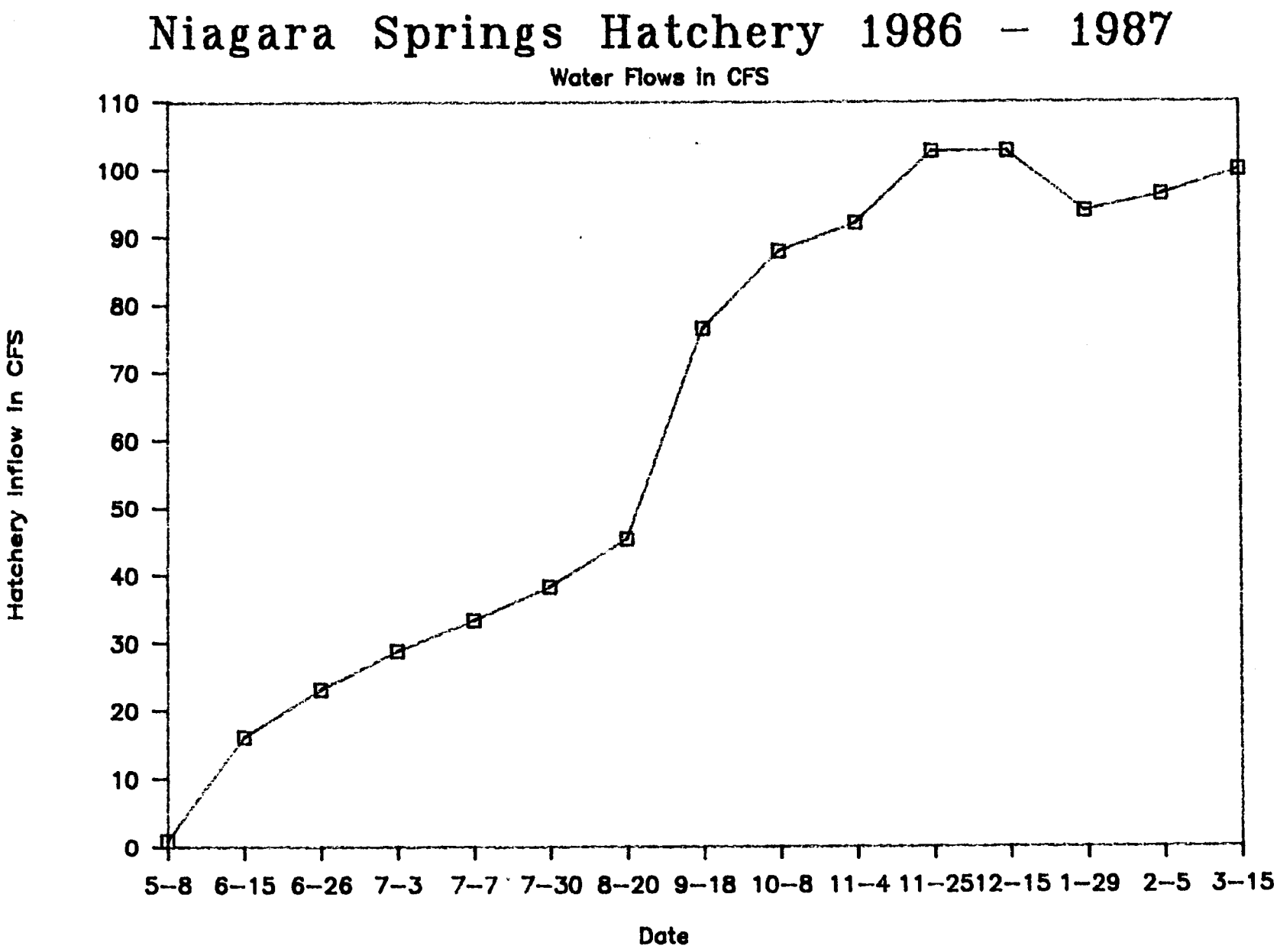

Figure 2. Flows at Niagara Springs Hatchery for brood year 1986.

This increased flow was required to produce a record 419,000 pounds of smolts. The previous record was 374,350 pounds and occurred in 1981 (Appendix 1). Dissolved oxygen (DO) going out of the raceways averaged 5.35 mg/1 in March, when the average raceway biomass exceeded 25,000 pounds (Fig. 3). Some of the raceways had DO readings below 5 mg/1, the minimal acceptable level for salmonids (Piper et al. 1982), indicating flows in excess of those used for final rearing are needed to provide safe rearing conditions to raise 400,000 pounds at Niagara Springs Hatchery.

FISH HEALTH

Approximately 72.9% of the yearly mortality occurred while the fish were in the vat room. Approximately 65,000 fish died in May. Some of this loss was attributable to unfertilized eggs and deformed fish, but it is believed that most of these mortalities were density related. Density indexes in the vats got as high as 1.2, and DO levels were less than 5 mg/1 before the fish were moved outside.

Fish began going off feed in late June and early July in an isolated raceway accompanied by an elevated mortality. Some myxobacteria infections were observed, and the fish were given a 1.5 ppm benzalkonium chloride flush for two days. The fish did not improve, and it was later confirmed by our pathology lab that the raceway had an IPN infection. The disease killed about 5,330 fish before it ran its course.

During September, all of the steelhead had their adipose fins removed by the Adipose Fin Removal Project crew. During September, there were 2,221 mortalities resulting from infection of the lesion. In addition, there were 4,302 mortalities that were the direct result of crowding and handling (Fig. 4). All fish were given a 2 ppm, 1-hour benzalkonium chloride flush treatment after they were clipped, but it did not seem to have much of an effect on the myxobacteria infections detected in later weeks.

Furunculosis (Aeromonas salmonicida) infections appeared for the first time on November 24 in an isolated raceway (Hells Canyon stock). Bacteria stains and streaks on TSA (trypticase soy agar) were made and sent to the pathology lab for confirmation on November 25. Romet 30 treatment was approved and fed to the fish for a 12-day period at 1% body weight. Quick diagnosis and treatment prevented major losses from this disease which has devastated the hatchery in past years. This outbreak caused the loss of only 179 fish.

Bacterial gill disease appeared in late January in one raceway. The fish were given a 1-hour drip of benzalkonium chloride at 1.5 ppm. Gill condition improved, but elevated mortality continued. Hatchery personnel discovered a gram-negative rod in the spleen of the fish from this raceway. Cytophaga psychrophila was confirmed in the spleen and

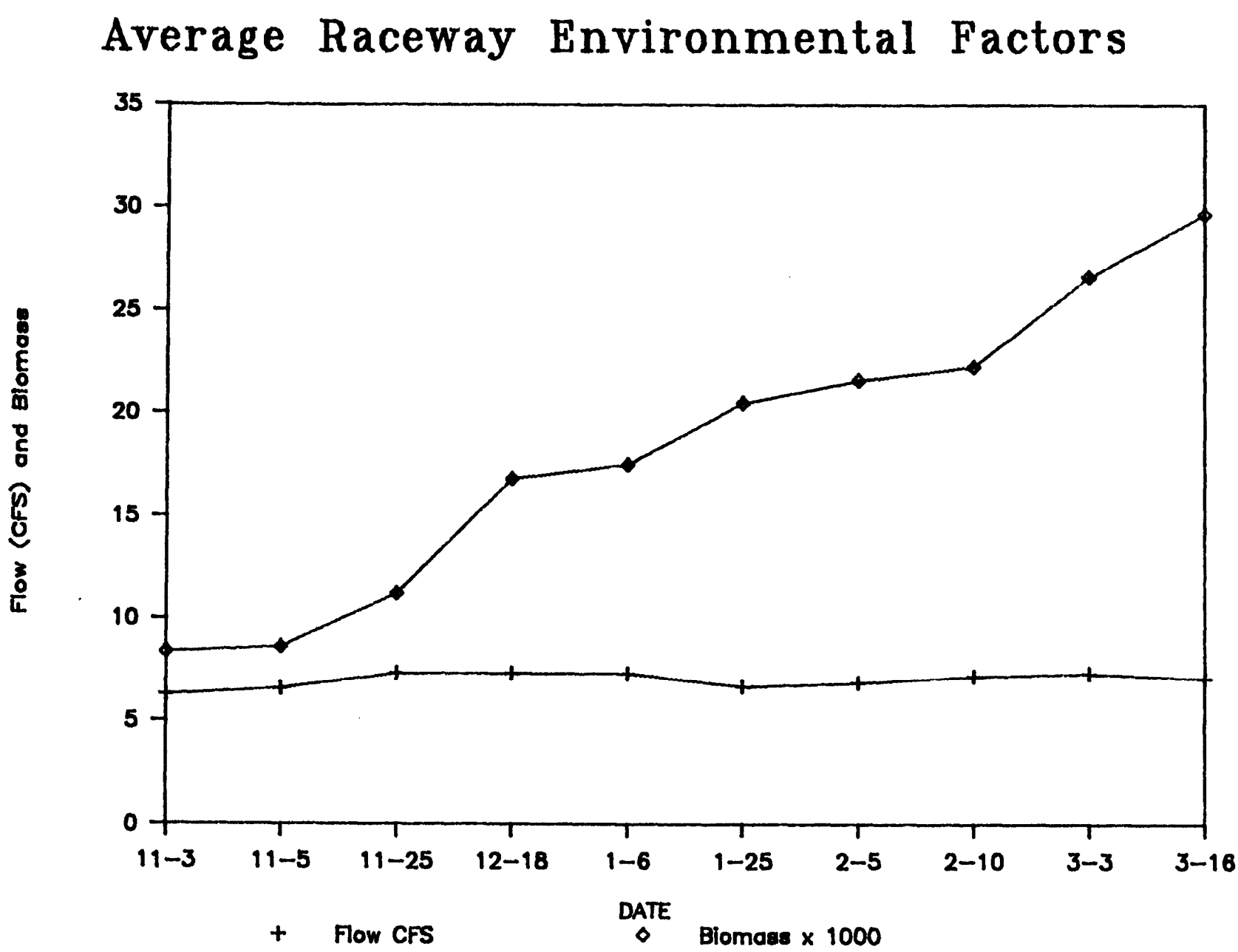

Figure 3. Average raceway flows, biomass, and dissolved oxygen (numbers in mg/l) for the critical period November to March 1986-87.

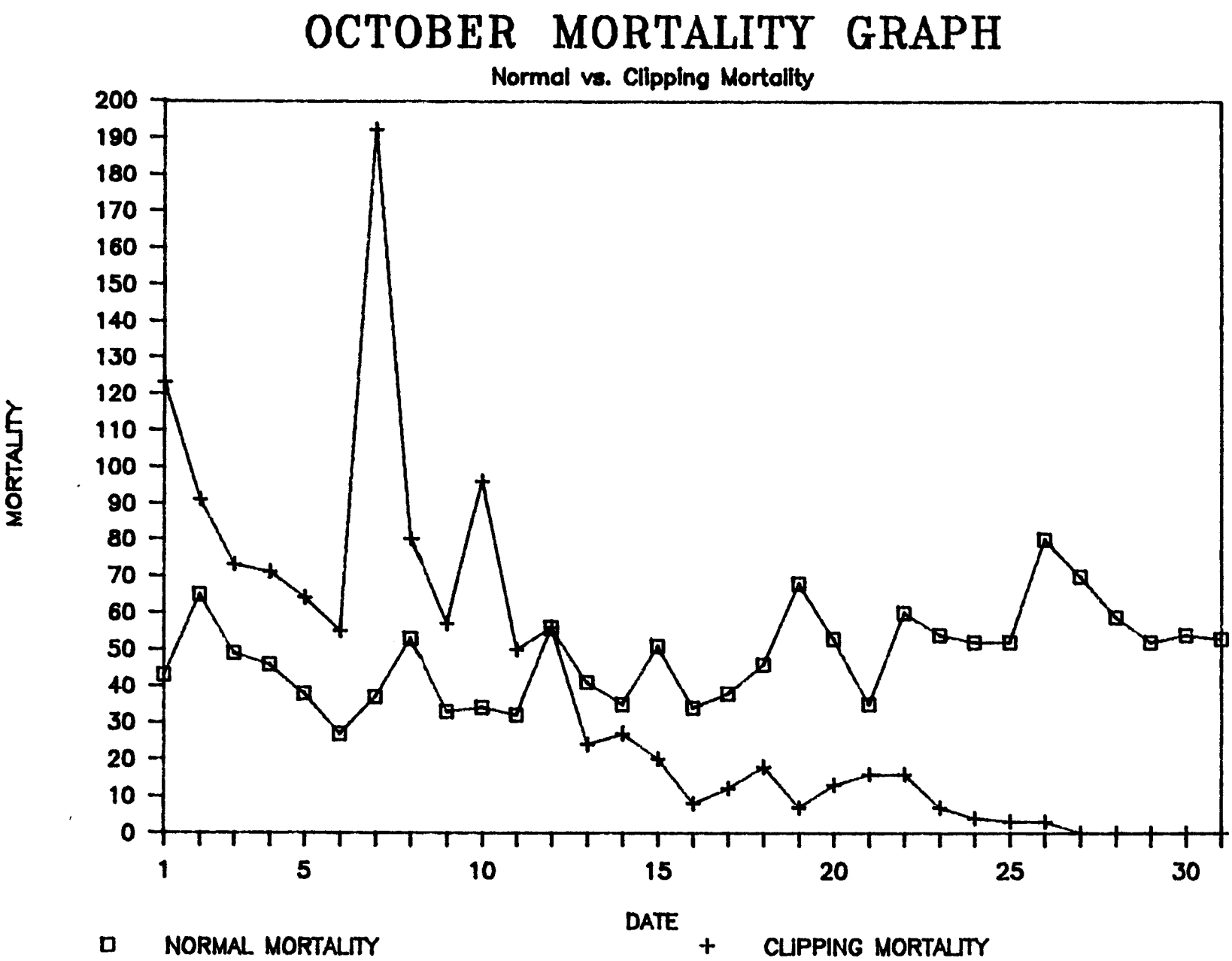

Figure 4. Delayed mortality of Niagara Springs Hatchery steelhead that occurred during October 1986 as a result of adipose fin removal.

kidney, but the lab did not recommend a treatment and none was administered. The disease lab confirmed IHN in these fish on February 4, 1987, but no excessive mortalities were attributed to this disease.

A second furunculosis outbreak occurred in early February. Romet 30 was again administered at 25 mg/lb. fish/7 days and fed at 1% body weight. No significant mortalities occurred.

FISH RELEASES

The station planted a record 419,000 pounds of steelhead smolts (1,851,895 fish). There were 800,000 fish released in the Snake River below Hells Canyon Dam in the spring, weighing 173,500 pounds and averaging 4.61 fish per pound. Hells Canyon fish were planted from March 23 to March 30 using two Idaho Power Company trucks and two Lower Snake River Compensation trucks.

During the period March 30 to April 9, 712,200 smolts, weighing 170,900 pounds, were stocked in the Pahsimeroi River. They averaged 4.1 fish per pound and were transported by two Idaho Power Company trucks and two Lower Snake River Compensation trucks.

Panther Creek had 299,700 fish planted from April 9 to April 13, weighing a total of 72,700 pounds. These fish were from Pahsimeroi stock and averaged 4.13 fish per pound and had a range of 3.7 to 4.4 fish per pound. These fish were hauled in two Idaho Power Company trucks and two Lower Snake River Compensation trucks. Because of the low water situation experienced during the spring of 1987, additional transport trucks were needed to haul fish.

The Hells Canyon presmolt plant on October 21 released 39,995 fish, weighing 1,900 pounds. These fish were 21.05 fish per pound when released and were transported by Idaho Department of Fish and Game tankers.

CODED WIRE TAGGING

During the first week of October, steelhead presmolts were implanted with a binary coded wire tag. These fish will be used for evaluation studies with regard to their release sites. Tag data is summarized in Table 1.

Table 1. Coded wire tag summary for steelhead at Niagara Springs Hatchery for brood year 1986.

Stock	Release site	Code number	Number tagged	Mortalities	Number released	Release date
Pahsimeroi	Pahsimeroi	10-29-50	26,112	118	25,975	3/30/87
		10-29-60	9,950	25	9,925	3/31/87
Pahsimeroi	Panther Cr	10-29-52	41,605	24	41,581	4/10/87
Hells Can	Hells Can.	10-29-53	40,031	36	39,995	10/21/86
Hells Can	Hells Can.	10-29-54	41,552	152	41,400	3/28/87

SPECIAL STUDIES

A continued study on delayed feeding was accomplished during the growing season. This study was to determine any adverse conditions in size, uniformity, and mortalities. However, station personnel felt it was biased because of the nursery conditions, flow, and density indexes were nearly exceeded upon initial hatch. Growth was monitored throughout the growing season, and final analysis indicated no significant differences between size, mortality, and final product of study and control groups.

A dorsal fin erosion study to determine when erosion occurs, how it appears histopathologically, and how it relates to densities, parasite loads, and fish size was accomplished. All groups had dorsal fin erosion within four months after hatch. Dorsal fin deterioration was noticed earlier in the group of steelhead reared in the highest density. The study found that blood flow was stopped in the dorsal fin when the capillary loops supplying blood were damaged near the fin margin. Lack of blood flow through the dorsal fin probably caused accelerated fin erosion.

A pectoral fin study was done to determine if the self-cleaning dam boards were affecting these fins. The control group of steelhead without the boards showed pectoral fin erosion at the same rate as the study groups with boards. The study determined that the self-cleaning action of the dam boards at 100 and 200 feet keyways was not the cause of pectoral fin erosion.

IMPROVEMENTS

Flow meter installation was completed in September, but was not fully operational for the first few months after installation. The Idaho Power Company engineering crew got the flow meter working by mid-December and it has been working satisfactorily since that time. In addition, residences 1 and 2 were painted this year.

MISCELLANEOUS

Tours of the hatchery were given to scout troops, school children, and senior citizens. Approximately 70,000 people visited the park and hatchery during the year. Hatchery personnel helped spawn fish at Oxbow, Rapid River, and Cabinet Gorge hatcheries and assisted in planting adult steelhead in streams to enhance natural runs. Hatchery personnel also assisted in fin clipping rainbow trout at Hagerman National Fish Hatchery.

LITERATURE CITED

R.G. Piper, I.B. McElwain, L.E. Orme, J.P. McCraren, L.G. Fowler, J.R. Leonard. 1982. Fish Hatchery Management, United States Department of the Interior, Fish and Wildlife Service, Washington, D.C. p.517.

Appendix 1. Niagara Springs Hatchery production history for brood years 1969 to 1986.

Production season	Egg total	Total mortality	Percent loss	Number released	Pounds released	Feed conversion
69-70	3,405,422	649,514	19.07	2,755,908	299,235	1.68
70-71	2,835,608	534,646	18.85	2,300,962	201,778	1.9
71-72	2,139,903	369,228	17.25	1,770,675	235,375	1.69
72-73	10,670,485	5,904,134	55.33	4,766,351	169,667	1.57
73-74	4,926,374	4,926,374	100.00	1,973,120	187,276	1.96
74-75	3,440,242	2,067,449	60.10	1,372,793	167,493	2.1
75-76	2,286,537	595,642	26.05	1,690,895	247,855	1.77
76-77	3,218,686	1,643,985	51.08	1,574,701	251,732	1.8
77-78	3,151,858	2,140,918	67.93	1,010,940	131,000	2.8
78-79	2,489,419	1,116,865	44.86	1,372,554	243,920	2.6
79-80	2,747,239	1,300,959	47.36	1,650,840	309,000	1.79
80-81	2,195,426	720,172	32.80	1,475,254	316,330	1.96
81-82	2,302,370	953,015	41.39	1,349,355	374,350	1.93
82-83	2,929,527	1,794,387	61.25	1,135,140	181,150	1.9
83-84	3,459,008	1,849,313	53.46	1,609,695	310,000	2.04
84-85	2,932,164	706,071	24.08	2,318,393	314,650	1.72
85-86	2,914,492	903,999	31.02	2,010,493	339,885	1.71
86-87	2,274,371	422,476	18.58	1,851,895	419,000	1.33
5 Year average	2,447,038	1,135,249	37.68	1,785,123	312,937	1.74
Overall * average	3,077,375	1,315,154	37.25	1,778,714	250,690	1.79

* 1973-1974 data was not used in the overall average due to complete loss that year. After removing all fish and disinfecting, fish were brought in from Dworshak National Fish Hatchery to rear and eventually release.

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